

IN THE CLAIMS

1. (Currently Amended) An X-ray tube in which an anode and a cathode are disposed opposite each other in a vacuumized inner space, electrons being able to be produced at the cathode, being able to be accelerated to the anode by means of impressible high voltage, and X rays being able to be produced at the anode by means of the electrons, the X-ray tube comprising a multiplicity of mutually complementary acceleration modules, each acceleration module comprising at least one potential-carrying electrode, a first acceleration module comprising the cathode with electron extraction, and a second acceleration module comprising the anode with the X ray generation, wherein the X-ray tube comprises:

at least one further acceleration module with a potential-carrying electrode, the acceleration module for acceleration of electrons being repeatedly connectible in series as often as desired, and the X-ray tube being of modular construction, said at least one acceleration module being interposed between the first and second accelerator module with the respective cathode and anode.

2. (Previously Presented) The X-ray tube according to claim 1, wherein the difference in potential between each two potential-carrying electrodes of adjacent acceleration modules is constant for all acceleration modules, the final energy of the accelerated electrons being a whole-number multiple of the energy of an acceleration module.

3. (Currently Amended) The X-ray tube according to ~~claim 1~~ claim 2, wherein at least one of the acceleration modules has a reclosable vacuum valve and/or vacuum seals on one side or on two sides.

4. (Previously Presented) The X-ray tube according to claim 3, wherein the acceleration modules include a cylindrical ceramic insulator.

5. (Previously Presented) The X-ray tube according to claim 4, wherein the insulating ceramic has a high-ohmic interior coating.

6. (Previously Presented) The X-ray tube according to claim 5, wherein the ceramic insulator comprises a ridged exterior structure.

7. (Previously Presented) The X-ray tube according to claim 6, wherein the anode comprises a target for X-ray generation as well as an emission hole for X-radiation.

8. (Previously Presented) The X-ray tube according to claim 6, wherein the anode includes a transmission anode, the transmission anode closing off the vacuumized inner space toward the outside.

9. (Previously Presented) The X-ray tube according to claim 7, wherein the electrodes of the acceleration modules include a shield for suppression of the stray electron flow on the ceramic insulator.

10. (Previously Presented) The X-ray tube according to claim 9, wherein at least one of the electrodes and/or shields comprises spherically or conically designed ends for reducing or minimizing the field peak at the respective electrode and/or shield.

11. (Canceled)

12. (Canceled)

13. (Previously Presented) The X-ray tube according to claim 1, wherein at least one of the acceleration modules has a reclosable vacuum valve and/or vacuum seals on one side or on two sides.

14. (Previously Presented) The X-ray tube according to claim 1, wherein the acceleration modules include a cylindrical ceramic insulator.

15. (Previously Presented) The X-ray tube according to claim 14, wherein the insulating ceramic has a high-ohmic interior coating.

16. (Previously Presented) The X-ray tube according to claim 14, wherein the ceramic insulator comprises a ridged exterior structure.

17. (Previously Presented) The X-ray tube according to claim 1, wherein the anode comprises a target for X-ray generation as well as an emission hole for X-radiation.

18. (Previously Presented) The X-ray tube according to claim 1, wherein the anode includes a transmission anode, the transmission anode closing off the vacuumized inner space toward the outside.

19. (Previously Presented) The X-ray tube according to claim 1, wherein the electrodes of the acceleration modules include a shield for suppression of the stray electron flow on the ceramic insulator.

20. (Previously Presented) The X-ray tube according to claim 19, wherein at least one of the electrodes and/or shields comprises spherically or conically designed ends for reducing or minimizing the field peak at the respective electrode and/or shield.

21. (Currently Amended) An irradiation system, wherein the irradiation system comprises at least one X-ray tube in which an anode and a cathode are disposed opposite each other in a vacuumized inner space, electrons being able to be produced at the cathode, being able to be accelerated to the anode by means of impressible high voltage, and X rays being able to be produced at the anode by means of the electrons, the X-ray tube comprising a multiplicity of mutually complementary acceleration modules, each acceleration module comprising at least one potential-carrying electrode, a first acceleration module comprising the cathode with electron extraction, and a second acceleration module comprising the anode with the X ray generation, wherein the X-ray tube comprises at least one further acceleration module with a potential-carrying electrode, interposed between the first and second acceleration modules with the respective cathode and anode the acceleration module for acceleration of electrons being repeatedly connectible in series as often as desired, and the X-ray tube being of modular construction, said at least one X-ray tube having a high voltage cascade for voltage supply of the X-ray tube.

22. (Currently Amended) A method of production of an X-ray tube in which an anode and a cathode are disposed opposite each other in a vacuumized inner space, electrons being able to be produced at the cathode, being able to be accelerated to the anode by means of impressible high voltage, and X rays being able to be produced at the anode by means of the electrons, the X-ray tube comprising a multiplicity of mutually complementary acceleration modules, each acceleration module comprising at least one potential-carrying electrode, a first acceleration module comprising the cathode with electron extraction, and a second acceleration module comprising the anode with the X ray generation, wherein the X-ray tube comprises at least one further acceleration module with a potential-carrying electrode, interposed between the first and second acceleration modules with the respective cathode and anode, the acceleration module for acceleration of electrons being repeatedly connectible in series as often as desired, and the X-ray tube being of modular construction; wherein:

the X-ray tube (10) is produced in a one-step vacuum soldering process.